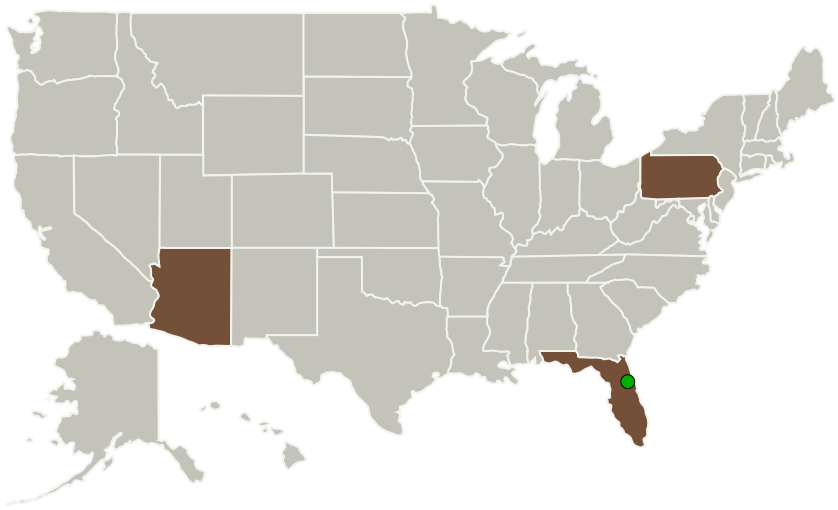
Ultra High Temperature Refractory Materials, Phase II

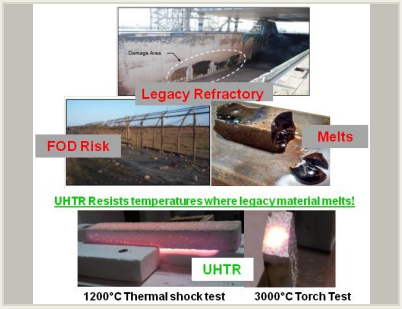
Completed Technology Project (2014 - 2016)

Project Introduction

Legacy refractory materials that have origins dating to the original Saturn program are commonly used in current launch facilities. Although they fail to meet the target requirements, they are the only approved material. Our research team has demonstrated a baseline system during the Phase I effort that combines a non-cement binder, a high temperature macro aggregate, and reactive nano aggregates to produce an Ultra High Temperature Refractory (UHTR). Our UHTR system has sustained short term exposures to 3000C in a laboratory test and excellent resistance to environmental aging. The Phase II effort will optimize the mechanical and thermal behavior based on rocket plume exposure testing.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Advanced Ceramics Manufacturing	Lead Organization	Industry Small Disadvantaged Business (SDB)	Tucson, Arizona
Kennedy Space Center(KSC)	Supporting Organization	NASA Center	Kennedy Space Center, Florida
Villanova University	Supporting Organization	Academia	Villanova, Pennsylvania

Primary U.S. Work Locations	
Arizona	Florida
Pennsylvania	

Project Transitions

September 2014: Project Start

December 2016: Closed out

Closeout Summary: Ultra High Temperature Refractory Materials, Phase II Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/140716)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Advanced Ceramics Manufacturing

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

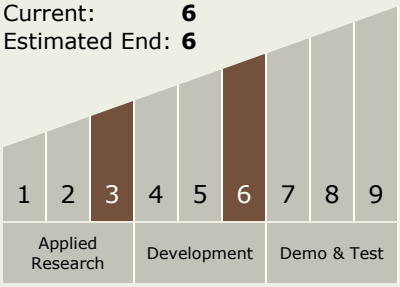
Carlos Torrez

Principal Investigator:

Zachary Wing

Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



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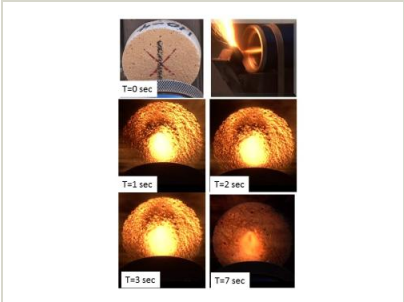
Images

Briefing Chart Image
Ultra High Temperature Refractory Materials, Phase II
(https://techport.nasa.gov/image/126400)



Final Summary Chart Image
Ultra High Temperature Refractory Materials, Phase II Project Image
(https://techport.nasa.gov/image/136632)

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.5 Coatings

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System